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Electrification: FRA plan sparks new interest

November 24, 1980

RAILWAY AGE

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Inside

LUTHER S. MILLER

DETROIT'S DILEMMA SOLVED?

"Railroads on the West Coast were watching with interest last week as a new piggyback idea began to take shape. The plan—moving new automobiles piggyback in truckaway-type open trailers—is being tested and studied on the Southern Pacific....From the shipper standpoint the piggybacking of new automobiles promises a way to bring some prime business back to the railroads. In 1957 railroads moved only the equivalent of three weeks' production of autos."

—*Railway Age*, March 9, 1959, p.9

Moving motor vehicles by train proved to be an idea whose time was overdue—and in the decade of the '60s one of the great success stories of railroad marketing and equipment innovation was written. In 1959, the railroads moved fewer than 10% of all new motor vehicles; in 1969 they moved 51.7%. By 1974 they had captured 55.2% of the business.

But in every succeeding year, the trend has been downward; last year railroads handled less than half of the available new-motor-vehicle traffic for the first time since 1968. The fact is, that great success story of the '60s became in the late '70s something of a horror tale.

The rack cars that handle this traffic have become enormously costly, averaging today around $90,000 apiece. Meanwhile, rigid distribution patterns have severely restricted their use. Railroads assign rack cars not just to a manufacturer, but specifically to that manufacturer's assembly plants for hauling a particular model. "To give you an idea of how bad the situation got to be," a Federal Railroad Administration official told us the other day, "a rack car that hauled General Motors automobiles from Atlanta, Ga., to Framingham, Mass., had to be returned empty to the Atlanta plant—despite the fact that there was another General Motors plant in Framingham shipping another General Motors model."

For railroads this has meant an appalling number of empty miles for expensive equipment. For their customers in Detroit, it has meant poorer service.

"The situation offered the opportunity for an enormous improvement in car utilization if all the different parties involved could be brought together," says Peter French, manager of the AAR's freight car utilization program.

How the different parties have now been brought together is described by Associate Editor Frank Malone in the story beginning on p. 16.

EXPORT COAL: THE VIEW FROM VIRGINIA

Travelers flying into Norfolk, Va., these days are being treated to an impressive sea spectacle. Spread out over Chesapeake Bay is a fleet of around 100 vessels riding at anchor. They resemble nothing so much as an invasion armada; actually they are waiting peacefully, though impatiently, for loads of Appalachian coal to take to Western Europe. The Chesapeake Bay traffic jam has received considerable publicity, and the word is abroad that neither the railroads nor their coal piers are equipped to handle the export coal boom. That is not entirely the case, as Norfolk & Western's John P. Fishwick points out in this issue's Railview (p. 42). Fishwick describes the present bubble of demand for export coal, and takes a look at the more substantial bulge that could lie ahead.

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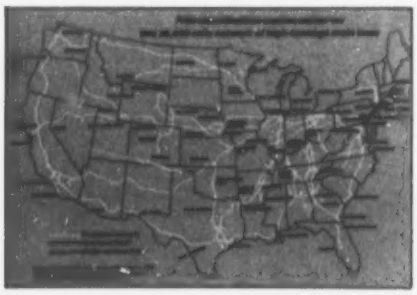

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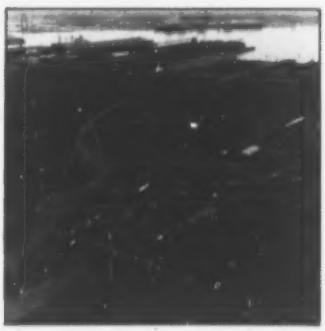

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COVER: Photo of multilevel auto racks in a Chessie consist was taken by William M. Kanzeg, Chessie System staff photographer.

Motor vehicles

The goal is to find the cheapest route from an unloading site to a plant where cars assigned to the shipper are needed next.

Detroit tries a bold new approach to

By freeing costly equipment from rigid distribution patterns, the customer gets improved service—and the carrier reduces empty mileage. Two automakers and 20 railroads are now involved in the program, and it's expected to spread.

By FRANK MALONE
Associate Editor

As U.S. automakers retool, their rail carriers are regrouping—the former to regain domestic market share, and the latter to regain automotive market share. Supporting their efforts is a new working arrangement between the two largest automakers and more than a dozen railroads—a tested program that is designed to produce higher levels of service and lowel levels of empty-car miles. Representatives of both sides agree that it is probably the most promising change ever in a long and often troubled relationship.

It's also a relatively radical change. It has been customary for railroads individually to assign cars to assembly plants on their own lines—and to return those cars faithfully to the same plants regardless where they're unloaded. Despite an outrageously high ratio of empty to loaded miles, and perhaps the highest ratio of cars owned per load handled, carriers have clung to that method of insuring car supply in order to protect their business. Under the new arrangement, cars from different railroads are pooled for use anywhere in an automaker's system, regardless of which carrier serves a plant.

Cooperation couldn't come at a better time, as both industries struggle against slides caused by slow response to market demand. For the automakers, of course, it has been the new demand for smaller, more fuel efficient autos; for the railroads, of course, it has been the old demand for better automotive service, especially in terms of car supply.

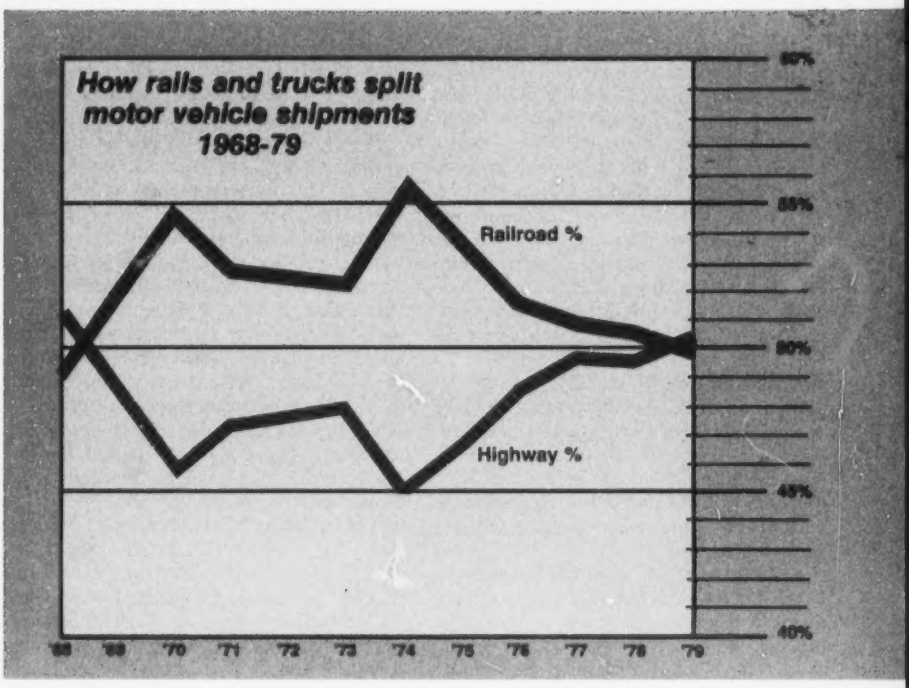
Now, as domestic automakers challenge foreign competitors with all sorts of front-wheel-drive vehicles that go farther and farther on a tank of gas, railroads are challenging truck competitors for that business with one of the best cooperative efforts in their history.

That history includes the recent bittersweet period of the rails' rise and fall as automotive haulers. After watching the truckers steal the show for decades, railroads strove mightily to polish their own act, especially through heavy investment in extremely specialized multilevel equipment. They did well enough that their share of new-vehicle transport reached 55.2% in 1974. It was the best year ever.

However, by early this year the rail share had slipped to 49.9%. Despite good performance by some roads individually, the industry as a whole was unable to consistently—and flexibly—satisfy automakers' demands. Not even a fleet of multilevels that had grown to 36,000 could do the job, because one thing that had not grown was efficiency in moving those cars.

● **High-cost racks, often empty.** For an industry plagued by poor utilization of equipment in general, the problem of the multilevel auto rack made other problems look mild by comparison—especially as the price of a fully enclosed unit (which automakers were demanding, or else) rose to about $90,000.

"Essentially, it was a case of expensive empty cross-hauling of very high-cost cars that were in assigned service to the same shipper," says Peter W. French, manager of the freight car utilization program (FCUP) launched by the Association of American Railroads' Research and Test Department in 1975. "The situation



rack car distribution

offered the opportunity for an enormous improvement in car utilization if all the different parties involved could be brought together."

With federal assistance, FCUP played a leading role in launching the General Motors multilevel reload project about a year ago. This project and a similar one started recently for cars in assigned service to Ford Motor Co. reduce empty mileage through coordination of return movements. This coordination no longer follows the old practice of sending cars empty back to their assigned loading points. Instead, it redistributes cars to locations in order to minimize the cost of empty movements across the entire system.

Two control teams based near GM and Ford headquarters in the Detroit area do the coordinating. Each team has a director and two car distributors who use direct, constant contact with plant managers as a basis for their contact with railroads. For moving cars, the carriers are obliged to follow the control teams' instructions, which are based on computerized monitoring and analysis of car locations and routings. The objective is to find the cheapest route from an unloading site to a plant where cars are needed next.

The GM pool has 6,000 cars; the Ford pool, 2,410. Together, they represent about 23% of the rail industry's multilevel fleet, and there are indications that the percentage is likely to grow. The experimental program's success first led to a broader program for GM, the original participant, then to a new, separate program for Ford—and this has already sparked talk of eventually including Chrysler and American Motors.

(Railroads now handle about 63% of Ford's vehicle traffic, compared with 67% four years ago. For GM, the share is about 41%, compared with more than 50% in the early 1970s.)

● **Results so far.** The reload program experiment included GM's 1980 model year and produced a saving of 6.7 million miles and an empty-to-loaded-miles ratio of .81, compared with the .95 that was afflicting the fleet in general. Eight railroads helped carry out the experiment: Southern, Chessie, Conrail, Frisco, Missouri Pacific, Family Lines, Norfolk & Western, and Florida East Coast. They served nine GM plants and 16 ramps with a pool of 2,200 to 3,300 cars.

The project was barely under way when its effectiveness became evident. Starting the 1980 model year with a minimal forecast, GM's Tarrytown, N.Y., plant suddenly reported a surge of orders. The Troy, Mich.,-based control team was able to respond and supply about 400% more cars than foreseen for the first month alone.

"A plant can shift radically in a very short time," says Richard V. Muehlke, French's assistant. "The only way you can supply the cars that the plant needs is to 'source' from many locations, and the only way to do that effectively is to have authority to do it from ramps on more than one railroad. That's the only way to catch a big upswing at a certain plant and not lose loads. We were able to do that in the very first month of the project and that was one of the first signs that it would be successful."

As of November 1, five more roads were involved in the GM program: Santa Fe, Southern Pacific, Union Pacific, Illinois Central Gulf, and Chicago & North Western. The pool grew by 2,300 cars, to serve 14 plants and 30 ramps. A sevenfold increase in miles saved, to about 46.8 million, is projected for the balance of the 1981 model year (November 1980 through June 1981) with an empty/loaded-mile ratio of .43.

As plans for expanding the GM program shaped up, so did establishment of a similar program for Ford; it started in September and will cover the entire 1981 model year. The Ford program is expected to save 4.37 million empty miles (smaller than GM's saving because of

lower loadings and less plant dispersion) and achieve a .84 empty/loaded-mile ratio. Four plants are involved, with a fifth coming in Jan. 1, and about 40 ramps.

Carriers participating directly in the Ford program are Southern, Family Lines, Santa Fe, Conrail, Missouri Pacific, Norfolk & Western, Florida East Coast, Chessie, and Detroit, Toledo & Ironton (being merged into Grand Trunk Western). There are also nine cooperating roads: Southern Pacific, Union Pacific, Western Pacific, Chicago & North Western, Boston & Maine, Delaware & Hudson, Burlington Northern, Missouri-Kansas-Texas, and Denver & Rio Grande Western.

● **Optimism at Ford, GM.** One of the promoters of the Ford program, because of the number of Ford plants on his railroad, was William E. Leavers, NW manager-car distribution and utilization. He's chairman of the Ford program steering committee, which also includes Charles E. Richards, supervisor of the equipment procurement and control section of Ford's transportation and traffic office, along with representatives of participating railroads.

Leavers says only time will tell what the actual savings will be, but he has no doubt that they'll be convincing: "We know for sure that we're going to save empty miles. There isn't any question that we can do a better job on empty return. The railroad industry realizes what this can mean in reducing the need to acquire equipment."

The chairman of the GM program steering committee, Harvey H. Bradley, SR assistant vice president-transportation, says, "We're really extremely optimistic about what can be done with this. The GM and Ford people have been pitching in, and it's been a real cooperative effort all along. If someone else says, 'Look, why don't you do that with us?', we want to go in and talk with them. It gives you a breakthrough cooperative effort from a good many of the carriers."

The GM committee includes, besides member road reps, William B. Kala, GM manager-rail transportation, and Leo Constantine, director of data control and analysis, AAR car service division. There's an assistant chairman, Ronald W. Drucker, Chessie general manager-transportation.

● **Optimism at FRA, AAR.** The list of names of industry and government people involved in the evolution of the reload programs from FCUP is a long one, including one from the Federal Railroad Administration, which provided start-up FCUP funding and still lends important systems support. A former Southern employee, Richard C. Shamberger, is now chief of the operations division of FRA's policy office, and an ardent promoter of the multilevel programs.

Shamberger says the time could hardly be riper: "The automakers understand that they are in trouble, the petroleum industry's in trouble, and the rail industry's in trouble, so we'd all better hang together or we're going to hang separately. The mood toward this is pretty good."

He expects to see the reload concept expanding for other U.S. automakers—and maybe even some importers. For that, however, a larger management mechanism will be needed, one that would likely put control under a new team working under contract for both manufacturers and carriers. That would require a greatly improved computer capability, something being explored by Peter Kerr, an FRA computer expert, who designed the systems approach now in use. Basically an adaptation of a linear program model, at Troy, Mich., it is tied in with GM's computers, and at Dearborn it is being tied in with Ford's.

The makeup of the control teams reflects the commitment by all parties. Director of the GM control team is John Slivka, a former GTW employee, who views the team as a "quasi-disinterested group that gets all the fighting cats and dogs together." Working with Slivka are William C. Bacon from GM and William Dooley from the AAR. The Ford team director is Ted Grabbe from Trailer Train, who got into this activity as part of the GM experimental team under Slivka. Working with Grabbe are Bob Beaudoin from Ford and Dave Jakubiec from the AAR. Both teams work 10 hours a day, six days a week.

Back at AAR offices in Washington, FCUP folks have high hopes for the reload programs that they helped initiate. French says the reload arrangements may well prove one of FCUP's most successful offspring. "A mark of that success is that their direction has been taken over in large part by the participating railroads and the auto manufacturers," he says, emphasizing that FCUP is happy to step back and spend its efforts on applying the lessons learned to other types of special equipment. FCUP still performs certain administrative duties related to control teams' salaries and expenses. These costs are divided among participating railroads.

● **Equipment standardization?** Over at FRA, Dick Shamberger is looking forward to possible long-run reload benefits that French and other rail industry representatives also foresee. These would come from standardization of automotive rail equipment. "The automakers are starting to see that we have to come to grips with the standardization problem, and if ever the time was appropriate, it's now," Shamberger says. French believes that the primary obstacles are not so much technical as corporate. For example, some automakers have specified different components as a way of protecting their car supply. With the reload program, he says, "there's no question that we can go after the universal car, which would achieve another big saving for the industry."

Automakers are likely to agree, if their acceptance of the reload idea is any indication, regardless of how much it may have been influenced by their own market problems. The main obstacle was railroad trepidation. "Some carriers were wary—there was that automakers' reputation for bludgeoning them out of more cars," Shamberger says. Adds Muehlke: "The approach to GM was the last step and one of the easiest. The hard part was getting the original roads to agree on something this radical. It took a long time. It took an ongoing organization to sponsor meetings; help in research, writing position papers, and running numbers; and do the political as well as the analytical work."

The approach to Ford was also easy, especially because that company had a few years earlier tried its own form of national pool. That effort failed for the same reason that a similiar effort of at least one railroad, Southern, didn't go far—lack of effective cross-carrier control. As Muehlke puts it: "Previously, there was a rather vaguely defined negotiating process between plant managers who had cars to spare and those who needed them, with corporate headquarters trying to wrestle with them both and the serving railroad trying to take care of each plant. Headquarters also had to wrestle with railroads trying to keep plant managers happy. The result was that cars didn't move quickly enough to where they were really needed. There was no coordinator with authority to sort things out and route cars efficiently."

● **Rewarding contracts.** GM not only has embraced the reload plan, it has been insuring with contracts specifying a sort of reward for better movement of empty cars. When empty miles exceed loaded miles, GM pays car-mile charges varying according to carrier. Conversely, to stimulate loaded miles, carriers pay varying per-mile charges when loaded miles exceed empty. GM has signed such contracts with SP, MP, UP, ICG, C&NW, FEC, Frisco, and Chessie, and contracts were also being discussed with SR, CR, SF, FL, and NW.

"This is a healthy situation, a cooperative effort that will help us in inventory control and the carriers in meeting equipment requirements," says Earl R. Wiseman, GM director of transportation economics. "We've had two-way loaded movements by truck for some time, but round-trip loaded movement of multilevel rail cars has been only minimally successful, because we didn't have the proper railcar control procedures."

There are some people, however, who think GM's enthusiasm for contracts

stems from some of the apparently high per-mile charges to which some carriers agreed, especially the 36 cents for one of the western roads.

Ford, too, likes contracts, but its agreements cover schedule maintenance rather than empty/loaded-mile ratios, and they apply to auto parts cars as well as to multilevels. The goal, however, is the same—better car supply. Ford has service-incentive contracts with WP, SP, MP, and D&RGW and is trying to work out similar agreements with roads in the East. Current contracts are for five years, governing movements of new vehicles and parts from Kansas City to the West Coast. In return for guaranteeing a 95% traffic share, Ford can charge carriers for failure to meet schedules on their parts of the route. Also, carriers pay Ford an allowance for tender of 30 or more cars.

"The big impact on us," says Aden C. Adams, Ford manager-transportation analysis and procurement, "is reduced premium freight costs. With consistent rail service, we don't have to fly or truck material to plants because of car delays. Railroads have lost some of our business, but now these contracts should increase their share again."

Waiting in the wings for some form of improved relationship with carriers, Chrysler moves about 60% of its vehicles by rail, slightly more than in 1975. That's due, however, to a reduction in the number of plants producing the same product, says D. B. Whitmer, director-traffic and customs. He's ready for contracts, reload programs, or whatever will help improve transit time: "There are still many opportunities for further improvement. Some progress has been made in certain areas, but on average, transit times have not shown any improvement in the past several years. They're averaging approximately one day longer than in 1977.

"We have had discussions with several railroads about the feasibility of contracts, for both built-up vehicles and auto parts. We believe contracts should cover equipment, rates, and service commitments. Deregulation is going to cause us to examine many aspects of how we conduct our business and work with rail carriers to our mutual benefit. We'll be looking for opportunities to eliminate costs and improve efficiency. That includes simplified communications and data transfer, as well as better service and car supply."

● **A threat sidetracked.** Also viewing contracts hopefully is Richard Haupt, director of Ford's transportation and traffic office, and perhaps the automaker representative best qualified for some final words on relationships with railroads. Many rail officers still remember Haupt's speech at a Greenbrier meeting in June of 1978. "It appears that the best we can hope for is that approximately three out of

L&D: AAR's prevention program goes right to the loading ramps

Two years ago, the title of a *Railway Age* article on motor vehicles loss and damage called the claim-payout numbers "numbing." They still are, having reached a new high of $92.4 million for 1979. In the past two years, however, a program to reduce that cost has quietly but firmly taken root at rail-side auto-loading areas across the U.S. and Canada.

"I am encouraged by recent efforts by the AAR damage prevention committee, which, if continued and expanded, can be extremely beneficial in focusing on causes of loss and damage and on solutions," says Don Whitmer, Chrysler's director-traffic and customs.

Whitmer is talking about the ramp-audit program of the Association of American Railroads' Damage Prevention Section, and about something that definitely will be continued and expanded. One reason it will is the enthusiasm of shippers, even though the program has shown that much L&D occurs before trains leave their plants.

● **Investigating the ramps.** In a herculean effort, a small AAR staff of investigating experts, with the full cooperation of automakers and railroads, in late September completed a 22-month cross-country probe of 61 automotive loading facilities. They logged about 52,000 miles and many thousands of hours in audits that often continued through three plant shifts.

Seeking loading-site causes of loss and damage, regardless of how minor, the investigators developed and displayed an expertise that won the respect of the manufacturers. "Shipper reception has been tremendous, because our people have gone in with experience that couldn't be found anywhere else," says Ralph A. Grover, AAR director of damage prevention.

But what, it might be asked, does that have to do with a $92-million problem? AAR teams don't just audit, they report their findings promptly and thoroughly, and that should eventually lead to lower claims. As Grover explains: "The problem stems from a hundred little things that aren't done right. We look at everything that causes damage, and we try to get shippers to make improvements. It's as much to their advantage as to ours."

The audit program is based on an important AAR document, the multilevel manual now being revised for reissue in early 1981. It meticulously describes loading, train-handling, and unloading of motor vehicles. "Our manual is just like a railroad safety publication," Grover says. "Safety publications are written in blood, because everything is in there because somebody got hurt. Everything is in our manual because some vehicle got damaged."

Involved in the field audits are Robert L. White, Jr., manager-commodity studies, as program director, and staffers Jim Britton, Charles Eggensammer, Ralph Groskopf, and Ken Weibel.

The program has expanded to include destination ramps as well. As of Nov. 1, White's teams had made 10 destination audits, of ramps chosen in direct relation to origin ramps. "We look at multilevels coming in from loading sites audited before," White says. The reason, of course, is to see if shippers have been heeding their reading of AAR origin-ramp surveys.

The audits cover every aspect of loading/unloading, including preloading in-plant practices, ramp-driver habits, and haulaway procedures. Multilevel components comprise a major element. "We've looked at more than 22,000 tie-down devices," White says.

● **Getting cooperation.** AAR staffers follow up their audits with calls to the low-rankers, but always with support from company officers. "The cooperative attitude is much better than it's ever been," says Grover. "We're getting to the people who can make decisions, and we're showing them conclusively where people in their own organization need to do a better job. With this level of understanding, we get shippers and carriers involved so that the finger-pointing stops and some constructive sharing of responsibility starts."

Another effort to reduce damage is the national task force program. This covers the entire distribution cycle with a scrutiny as scrupulous as that for origin and destination audits.

Blessed by the AAR damage prevention committee, the Grover/White program includes many good features from carrier projects. "The railroads have been out there saying the same things," Grover says. "We're not telling the auto manufacturers anything very new, but they'll listen to a sort of third party."

Another major element in automotive traffic L&D prevention is training. Within the past six months, the AAR's prevention staffers have released a new batch of formal vehicle-handling training programs for carriers and shippers. The programs stem in part from AAR-conducted workshops.

Along with audits, training programs will become a crucial weapon in a war that statistics show the railroads have been losing.

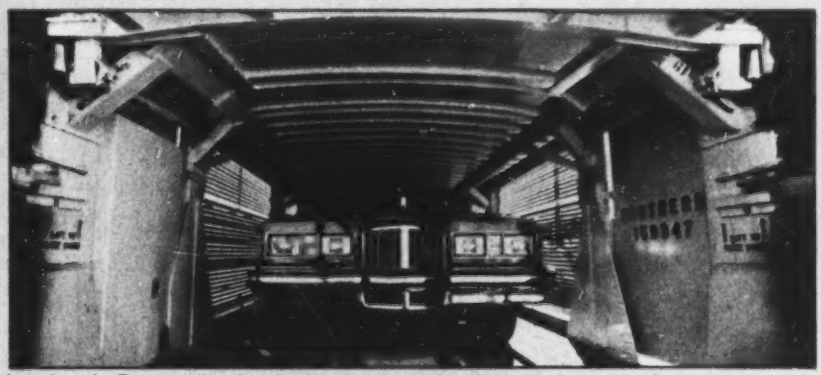
every ten of our multilevel cars will reach destination on the schedule that *you* have said *you* can perform, and that's pretty bad," Haupt said, among other things.

One thing was a threat: "I want you to fully understand that we are willing to spend more money to move our product by other than rail transportation if this is necessary. Senior management has been made aware of the decline in carrier performance, and by no less than a mandate from our bosses we have been told to rely less upon rail transportation unless we can commit to improved rail performance."

He also pleaded for better interroad handling of multilevels and auto parts cars.

When the Greenbrier talk was made, Ford had nearly despaired of bringing railroads together, says Haupt. For its part, Ford launched a transit action program of meetings with groups of carrier reps to discuss worst-performance routes. Also for its part, the company supported and joined the reload program, and worked out service contracts.

Currently at least, Haupt sees no need for another alarm-sounding speech. He says: "I guess that right now I'm reasonably optimistic." ■



Interior of a Portec trilevel rack, showing the rackmaker's tracks and tie-down system. Standardized tie-downs are important for development of car pools for faster reloading.

Multilevel racks need refinements to cope with the new breed of autos

The fully enclosed, multilevel auto rack car represents one of the longest—and most expensive—evolutions of special rail equipment. There's now a user-carrier consensus that evolution of the basic unit has peaked, and the current stage is one of refinement of some crucial components. That refinement, however, may be more difficult than expected, as automakers' products undergo a new evolution to the "international" smaller, lighter, more efficient vehicle.

Equipment suppliers, of course, are concerned, and one of them is Portec, whose Railcar division has taken a total-car systems approach to research and development. The division's vice president-sales is Charles M. Burt, who sees refinement needed in end-doors and tie-down systems, as do other manufacturers. But he also sees particular pressure for refinements related to a new breed of automobiles.

After developing equipment designed to move and protect the "typical American car," suppliers now have to shift a gear or two. Says Burt: "We now have to look again at the automobile evolution from the large, heavy vehicle to what we are getting to know as the international car, a light, small vehicle. You get more vehicles on the auto rack car, consequently a higher risk of damage, especially as the lighter auto responds differently to impacts. Now we have to take a whole new look at what happens to the auto in transit."

● **Giving cars a better ride.** One thing Portec Railcar researchers are looking at is better cushioning material for the insides of steel racks. Other things are components such as snubbers and spring groups to improve ride quality.

Among the most important elements are tie-down components. The tie-down track is standardized, but there are costly differences in the chains and hooks that secure the vehicles to the tracks. A basic difference is that between the "T" and the "R" hooks, the most common hooks that fit into holes or slots on the undersides of vehicles. There are also "U" and "S" hooks.

All are featured in the manual of standards and practices of the mechanical division of AAR's operations and maintenance department. They're there mainly because of shipper preference, although there is growing agreement on the need for standardization. Along with different hooks, however, there are various chain lengths and varying vehicle locations of holes or slots for the hooks.

"Standardization of that tie-down system is important for development of a national pool, as is being discussed for faster reloading," Burt says. "When you start talking about reloading, you're talking about ability to load a product in general, not an individual manufacturer's."

Tie-down problems are surfacing especially for lighter autos at the ends of auto rack decks, where they are subjected to greater chain strain than the autos in between—a strain that can cause auto bodies to buckle.

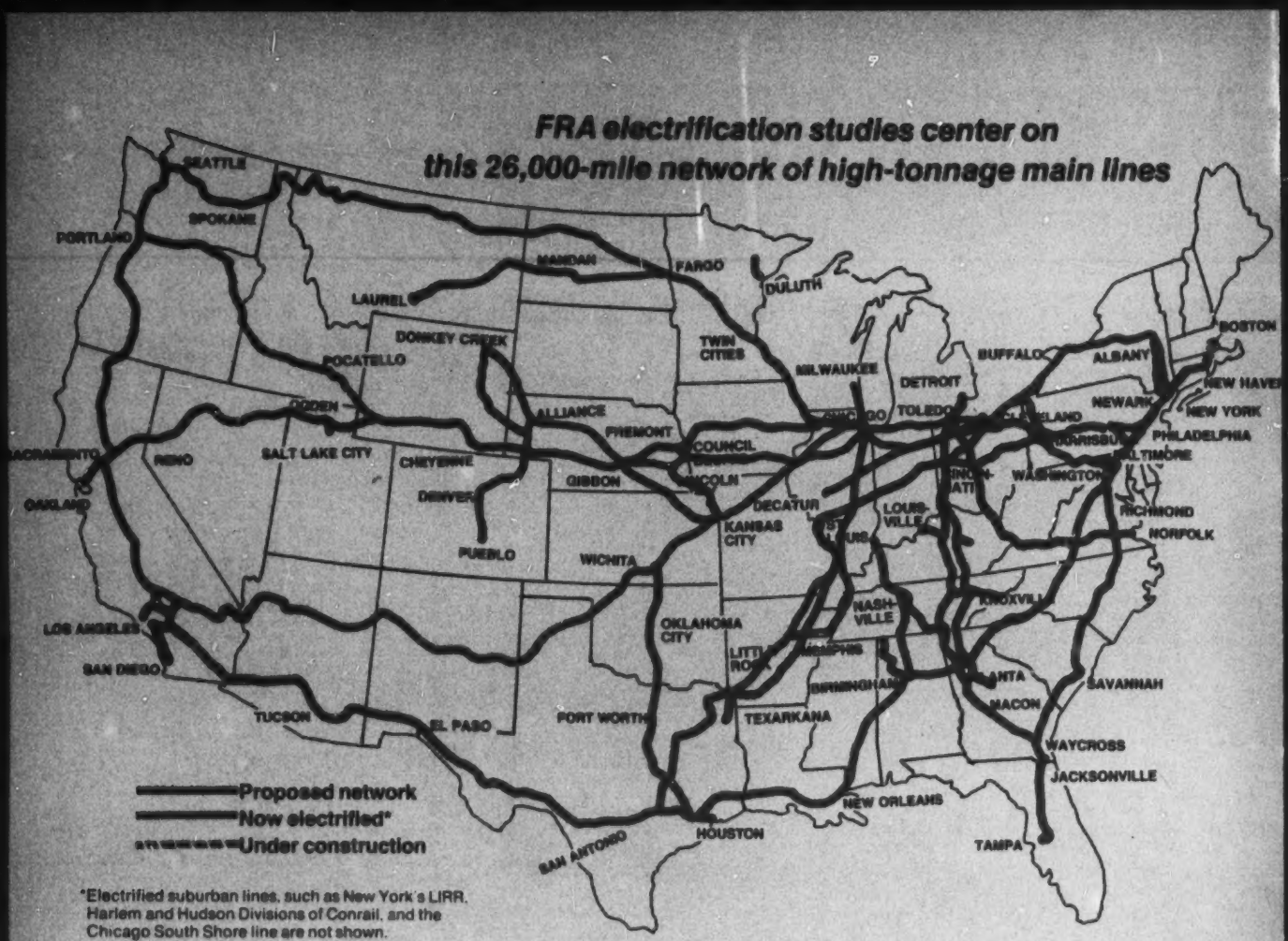
Another deck-end problem is height clearance. "As you go to the smaller cars, you're also going to taller cars, because there's less room for a person to spread out. You have to sit erect in them. If there are hinge decks at the ends of auto racks, the taller vehicle has clearance problems," Burt says, adding that Portec's answer is a fixed deck from one end to the other.

● **"Mechanical nightmares."** Perhaps the biggest problem, however, is the end door, regardless of auto size. The doors rounded out the fully enclosed auto rack, in an effort to block access to vandals and flying debris. But doors have become "mechanical nightmares," in the words of an AAR loss and damage specialist, and Burt agrees. He says mechanical simplification of end doors is a major goal of his company's R&D efforts. Other suppliers—among them Youngstown Steel Door, Paragon, Whiting, and Whitehead & Kales—are working on the same problem.

"You ask a railroad man, and he'll tell you the end of a car is the worst possible place to put a door," Burt says. There's already an overhang of 11 to 13 feet for rack cars with 56-foot truck centers, and adding an end door just makes things worse.

Whatever the component, it all boils down to suppliers' renewed concern about a well-developed piece of equipment, a concern stimulated by automakers' retooling for a market that has changed radically in a short time.

If that weren't enough, there's yet another wrinkle. After prodding suppliers toward development of the fully enclosed auto rack, one major automaker now is calling for one that's not so fully enclosed. In an understandable effort to hold down rail rates during trying times, Ford wants to use less-costly, side-shielded cars.



Electrification talk is getting more serious

Interested railroads are ready to work with the FRA to study how a nationwide network of electrified rail lines could be shaped, financed, and operated. Primary goal: achieving fuel security.

Some major U.S. railroads are serious about electrification—at least about discussing its major aspects with the federal government. Surfacing recently at a conference sponsored by the Federal Railroad Administration, the railroad seriousness will remain a matter of public record worthy of attention from FRA under the Reagan presidency.

Also worthy of attention will be arguments in favor of electrification, especially in view of another matter the new Administration must consider, namely the national need for greater energy independence.

Southern, Conrail, Union Pacific, and Burlington Northern have all at one time or another undertaken their own studies of electrification. At an Oct. 22 meeting in Kansas City, high-ranking representatives of those roads told Federal Railroad Administrator Jack Sullivan that they were willing to take part in joint studies of specific crucial aspects such as financing, which no carrier could handle on its own. Spokesman for the carriers told *Railway Age* on Nov. 5 that the commitments remained intact.

● **Aspect: Green.** In Kansas City, Sullivan phrased the conference's major question as follows: "Assuming that we could overcome the capital barrier, would you undertake a serious discussion of an electrification program?" He got unqualified yesses from John C. Kenefick, UP president; Thomas J. Lamphier, BN transportation division president; John L. Sweeney, Conrail senior vice president; and Walter W. Simpson, Southern vice president-engineering. Some other railroads represented at the meeting have since expressed interest in working with the FRA.

As a result, FRA staffers are organizing four working groups to study: (1) the shape of an electrified system; (2) its financing; (3) technical and operating elements; and (4) interinstitutional elements such as environmental impact. In charge of assembling these study panels is Lou Thompson, who has been directing improvement of the Northeast Corridor for FRA.

"Electrification is an idea whose time, everybody realizes, is coming as much as it ever will," Thompson says. "It's time to get on it and figure out whether there is a way to do it. The FRA has gone about as far as it can go with this, and now it's time for us to be dealing directly with the rail-

Net investments and savings due to electrification

Category	
Route miles	26,000
Traffic (MGTM/Y)	945,800
Investments (million $):	
Catenary	6,040
Substations	2,620
Signal and communications	4,400
Civil reconstruction	1,660
Electric locomotives	5,240
Total investments	19,960
Credits (diesel locomotives)	−5,060
Total capital requirement	14,900
Annual costs and credits (million $):	
Diesel locomotive replacement	−281
Diesel energy	−1,500
Electric energy	1,110
Diesel locomotive maintenance	−1,360
Electric locomotive maintenance	409
Catenary maintenance	114
Net annual savings	1,510
Economics:	
Cumulative savings (29 years)	43,790
ROI	14%

roads. Otherwise, we're not going to get good answers to our questions."

Rail industry involvement will be crucial not only for analyzing but also for promoting electrification among energy alternatives. As Sullivan says: "Part of our getting together is to prepare our case for a known technology and known benefits. We have to get input from the railroads to really make a solid case."

FRA studies have centered on a 26,000-mile system of main lines handling 30 million gross tons or more a year. The system represents nearly 14% of all route miles but handles more than 50% of all rail tonnage, based on 1978 figures. Electrifying those 26,000 miles would mean that railroads' yearly oil consumption would drop by 56 million barrels, according to FRA. That's about half of current annual consumption.

● **The goal: Power security.** "In the event of a petroleum shutoff, the rail system would be largely insulated," Sullivan says. That security seems to rank higher in proponents' minds than the savings in overall national petroleum use, because the rail industry already accounts for less than 2% of national consumption. Electrification could reduce that share to about 0.6%.

As BN's Lamphier says: "We have been very serious about electrification because we're more concerned about availability of diesel fuel than we have been about its price. The independence idea is very attractive to us."

An insulated rail system, however, would be free to handle increased traffic from fuel-short trucks as well as to continue handling its own loadings. "Apparently, during World War II, the Pennsylvania Railroad increased the flow of traffic over its electrified network by about 40%," Thompson says. "If the electrified network that we're talking about did that, the fuel savings would more than double because of the shift of traffic from trucks. So you can't look only at the rail mode's low percentage of fuel consumption. You have to look also at the truck mode's high percentage as reduced by greater reliance on a secure rail system."

FRA studies project a 14% return on investment for the 26,000-mile network over a 29-year period. Net annual savings would total $1.5 billion, for cumulative savings of $43.7 billion on total capital investment of $14.9 billion.

At the Kansas City meeting, Sullivan and Thompson cautioned that the shape of an electric network still needs a lot of study. Refining the configuration would be the duty of the planning panel, whose members would first have to define the criteria for deciding which lines would be electrified. Thompson says the FRA system proposal would be refined so that a working draft would be available for the panel's pondering. The panel then would try to produce a "quantitatively justifiable" system, one that could survive attempts to change it for purely political reasons.

● **Financing the system.** The key panel, however, will be the one dedicated to producing a financial mechanism for a project that at first glance seems staggering in cost. The largest single element would be the catenary system, estimated to cost more than $6 billion. The government would have to share the burden, but in such a way as to guarantee a recovery of its funds. One way would be a sort of variable user charge, based on kilowatt hours used, for payback to a federal revolving fund.

"We have to find a mechanism that permits payback on a basis that does not appear immediately on a railroad balance sheet," Thompson says. "Each segment could be financed by a revolving fund. Knowing the capital cost when completed and projected traffic levels, you would calculate the electrical energy needed, divide that into the traffic, and reach a prorated payment to be made for each kilowatt hour. Cost/traffic calculations would lead to the amount to be added to the monthly electric bill as payback to the revolving fund.

"The important thing is that this would take the payments off the railroads' balance sheets and convert them from fixed charges to user charges variable with the traffic. That's exactly the situation now enjoyed by the trucks and barges."

Thompson emphasizes that such a mechanism needs a lot more study, for administrative as well as functional reasons, but he sees it as probably the only workable plan. He also sees it as a way to deal with each railroad as a contractor, as the Federal Highway Administration deals with states on the Interstate system. That way, the government role remains more palatable than, for example, its role in Northeast Corridor renovation.

As for the term of payback, railroads could choose between 10 and 20 years. "According to estimates that we have, a ten-year payback schedule would result in nearly all the saving from electrification going for payback," Thompson says. "A 20-year schedule would have about half the savings going to the revolving fund and the other half accruing immediately to the rail industry."

● **Operating the system.** As for the technology/operations panel, a major concern would be the signal and communications systems for an electrified network, differing from those for diesel operations. Addressing this major-cost element, the panel would also address a major-savings element, the reduced cost of maintenance for electric locomotives. At the Kansas City meeting there was wide agreement that maintenance savings would be significant, though there are differing estimates of just how significant. This panel, Thompson says, would attempt to answer all the questions for people who've never run an electric railroad.

One thing they won't have to answer are questions about electrification's fundamental technology. "There's nothing particularly exotic, or difficult, or even unfamiliar about it," Thompson says. "That doesn't mean it can't be made better, but there is just no argument remaining that electrification won't work or that it depends on major new technological advances for success.

"Many other countries are way ahead of any scale of electrification that we would ever be likely to discuss for the U.S. One good example is the Soviet Union, which runs an electrified railroad that basically runs the rest of the country. They are increasing the size of that system by about 600 miles a year. They regard the technology as proven enough for them to structure their economy around it." Supporting that viewpoint at the Kansas City meeting was a technical panel consisting of AAR, FRA, and rail industry representatives.

● **Economics of the system.** The fourth study group would address interindustry or interinstitutional problems, especially those of the utilities. One question would be the utility industry's ability to handle

FRA estimates that reduced locomotive maintenance could account for 62% of savings achieved by electrification.

increased demand from an electric rail system. In Kansas City, rail officers told Sullivan that utilities in their territories foresee no great supply problems. Agreeing was Blair Ross, an official of American Electric Power Co. and a long-time advocate of rail electrification.

Utilities, however, would face capital outlays for new units, transmission and distribution facilities, and traction substations. There would be state regulatory problems, too, along with environmental concerns.

But perhaps the biggest task of this panel will be to determine and defend the economics of railroad electrification, in the face of other alternatives for national energy security. One man who has been working on this issue for several years is Robert K. Whitford, a member of Purdue University's automotive traffic center. In August, Whitford completed a study for the U.S. Transportation Department that said rail electrification, using existing technology, is cost competitive with synthetic fuel plants now and "should be considered by the United States as a potential national investment of equal priority."

Such things as construction of synthetic fuel plants, gasohol production, and improvement in automobile fuel economy are limited in investment level by technology and other constraints, Whitford says. "In addition, the full output of synthetic fuel plants will be needed to supply automotive needs for a very long time to come. Railroad electrification provides another reasonable, economically compatible, fuel-conservation alternative without new technology constraints."

That, essentially, was Whitford's message at the Kansas City meeting, too, where he outlined the investments and savings of electrification along with those of alternatives such as shale oil, coal liquefication, biomass (grain), and automobile efficiency. He also compared the technology risks for each alternative, as well as energy efficiency and social/environmental impact.

● **FRA's findings.** FRA's own studies stem from the well-known preliminary report, "A Prospectus for Change in the Freight Railroad Industry," published in October 1978 in response to requirements of the 4R Act. An appendix of that report addressed the costs, benefits, and energy/environmental impacts of electrification as directed by section 901 of the Act. Findings were that certain route segments were likely to benefit significantly, although national benefits, especially in lower petroleum consumption, would not be large enough to warrant government sponsorship of a major program of rail electrification. FRA, however, proposed to support further research, and one result was an update of the appendix evaluation of costs and benefits published in 1978 and based on 1976-77 realities.

Released in April, the update shows that estimates of net operating savings from electrification have more than doubled since the appendix evaluation was made (investment estimates have "approximately" doubled). "Railroad electrification is a mature, demonstrated technoiogy, and is the only mode for intercity transport of goods and people that can be shifted from liquid petroleum-based fuel without the need for additional technology development," the update said, before concluding that goverment support of a demonstration project is warranted. "While the demonstration project may also provide stimulus to other railroads to electrify, it is prudent that a more defined policy be developed by the FRA to provide incentives to electrification which are consistent with the expected social benefits," the update concluded.

The update also cites a major study completed last year by Gibbs & Hill, showing that electrification of Conrail sectors east and west of Harrisburg is technically and economically feasible. Discussing that study at the Kansas City meeting, Garry Collins, CR director of corporate planning, said the railroad has no doubts whatever about the economic benefits of the shift. One of the greatest benefits, he said, would come in reduced locomotive maintenance. Another would be in fuel-cost savings, which Collins said had likely been underestimated.

● **Other studies.** Another major study is under way, that of partial BN electrification, by Arthur D. Little. BN's Lamphier says the study already has shown that return on investment might be even higher than estimates by FRA for electrification in general.

Of a study in the early 1970s by UP, Kenefick says: "It looked quite interesting, but the price tag was $500 million, so we put the project aside. If the price tag had been lower, we certainly would have made a more detailed study and we probably would already be putting up the wires."

Southern, too, was an early studier, especially of its main line between Atlanta and Cincinnati. "We have never really stopped studying it," Harold H. Hall, SR president and chief executive officer, says. At Kansas City, Simpson said Southern basically agrees with FRA on the benefits in general, but would like to see better analysis of locomotive maintenance savings in particular.

● **The cost problems.** While agreeing on the potential for savings, the railroaders also agree that the potential costs are cause for some sober thinking, indeed. A good summary of those costs comes from Purdue's Whitford: "The major cost of electrification occurs in two categories: namely, in the fixed plant required to achieve electrification and in electric locomotives. The largest of the fixed plant costs per route mile is the catenary. Other costs involve the upgrading of the utility (both its generation and transmission capacities) to meet the added power requirements, substations to mate the power from the utility to the catenary, burying the communication and signal cables to reduce the effects of noise and interference, and the civil reconstruction necessary to ensure adequate clearance for the catenary.

"A conservative estimate of the fixed plant cost, according to recent, actual engineering data, appears to average about $500,000 for each route mile of single track and $800,000 per route mile of double track. In the second area of investment, the cost of electric locomotives, on a per-horsepower basis, appears to be equal to or slightly below the diesel equivalent." He cites price tags of $900,000 for a 3,000-hp diesel locomotive with an 18-year life and $1.2 million to $1.5 million for a 5,100-hp electric locomotive with a 30-year life. He also cites electric locomotive capability of traveling 187,500 miles a year, compared with 125,000 miles for diesels, and a 25% higher general availability rate for electrics.

Such statistics are part of the reason for FRA's estimate that reduced locomotive maintenance could account for as much as 62% of the savings to be achieved by electrification, compared with about 26% from reduced energy costs. Churning out such estimates have been, among others, Curt H. Spenny and Frank L. Raposa of the Transportation Department's transportation systems center. They have the analytical tools that will be available to members of the industry-government working groups that Thompson is organizing.

But the railroaders have the experience needed for further analytical pursuits. "From here on out, if the idea's going to be developed it's got to be a joint effort," Thompson says. "It's got to have a lot of industry participation or it will never have the kind of credibility that it will need in order to move forward."

Thompson sees the panels as oriented toward "essential homework" on aspects of an idea whose merits, he says, are "essentially nonpolitical." ■